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APPENDIX 1
FUNCTIONAL REQUIREMENT SPECIFICATION
FINAL SOFTWARE REPORT
DATA ITEM NO. A005

INTEGRATED ELECTRONIC WARFARE SYSTEM
ADVANCED DEVELOPMENT MODEL (ADM)

PREPARED FOR:

NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

CONTRACT N62269-77-C-0070

RAYTHEON

ELECTROMAGNETIC
SYSTEMS DIVISION

1 OCTOBER 1977

APPENDIX 1

FUNCTIONAL REQUIREMENTS SPECIFICATION
FINAL SOFTWARE REPORT
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INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No.   N62269-75-C-0070

Prepared for:

Naval Air Development Center
Warminister, Pennsylvania

Prepared by:

RAYTHEON COMPANY
Electromagnetic Systems Division
6380 Hollister Avenue
Goleta, California 93017

1 OCTOBER 1977

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1.0 SCOPE

This document describes the software functional requirements for the system controller unit of the Integrated Electronic Warfare System (IEWS).

2.0   APPLICABLE DOCUMENTS

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

AETD-XAV-1000	Experimental and Developmental Specification IEWS (Integrated Electronic Warfare System)
AR-106	Commonality of Digital Computer Hardware and Programming Languages within a Weapon System, Requirements for
WS-8506	Digital Computer Program Documentations, Requirements for

RAYTHEON SPECIFICATIONS

574773	Software Product Assurance Plan
Vol. - 7	Raytheon Engineering Standards Manual - Computer Programs
53959-GT-0301 Rev. A	System Controller Unit Hardware Development Specification (ADM) IEWS

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3.0 REQUIREMENTS

3.1 INTRODUCTION

The requirements set forth in this specification reflect the system requirements specified in AETD-XAV-1000 Experimental and Developmental Specification IEWS (Integrated Electronic Warfare System) and the IEWS system architecture.

3.1.1 System Configuration

The IEWS system configuration is illustrated in Figure 1. The system controller shall comprise the central processing and control element in the IEWS system. The system controller shall receive a combination of processed and unprocessed data from the signal sorter which characterizes the signal environment. The system controller shall process this data to assess environment and exercise a decision process to determine and implement a response against hostile emitters which may be present. The system controller shall supply data to and respond to requests from the operator control and display unit. The system controller shall respond to alert messages generated by various units attached to the system controller to alleviate various overload conditions which may exist from time to time depending on the operational environment.

3.1.2 System Controller Configuration

The system controller shall be configured as shown in Figure 2. A multiple processor architecture shall be employed using three microprocessors and an interconnecting network of two port memory modules. Interface provisions shall be provided from each of the microprocessors to the various units comprising the IEWS as shown. The microprocessor employed in the system controller shall be the Raytheon RP-16.

Task assignments among the three microprocessors shall be allocated to achieve a loosely coupled federated processing system. Basically, it is intended that the processing be partitioned as follows:

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Figure 1. IEWS Simplified Block Diagram
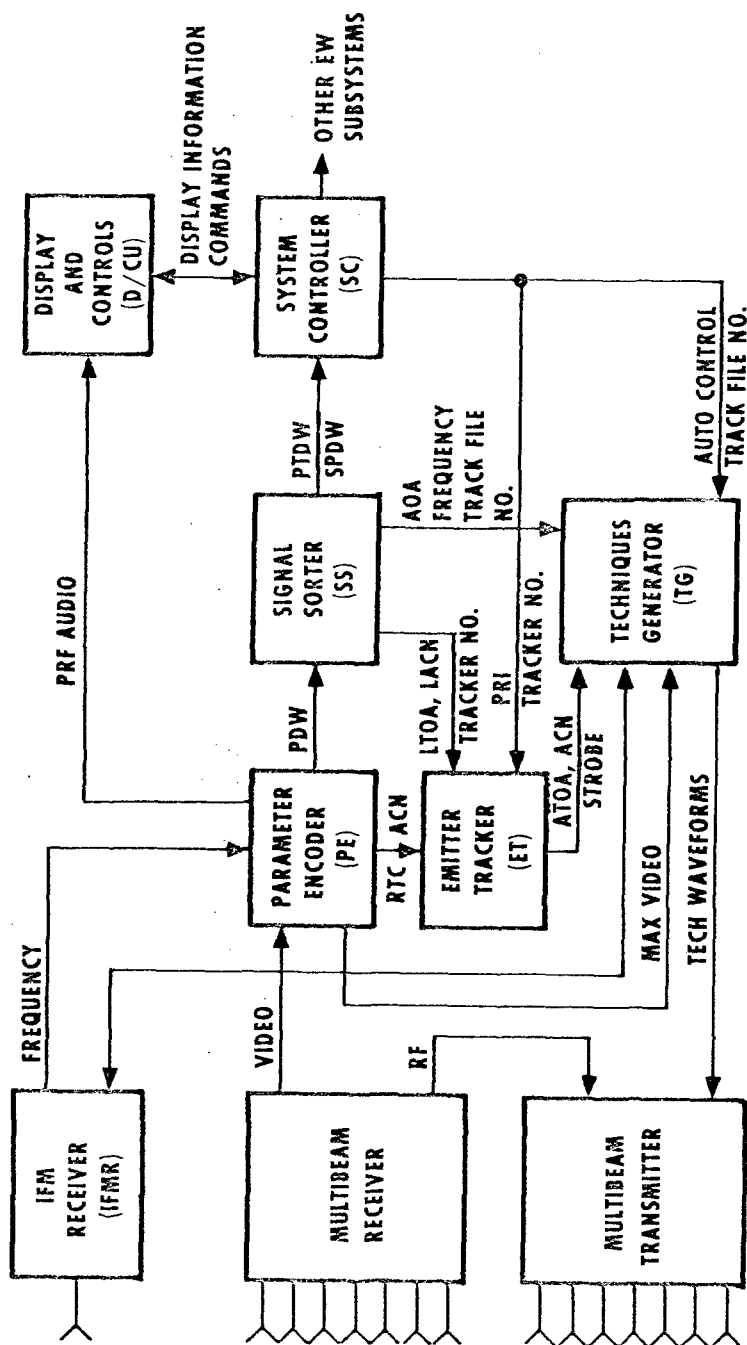
ACN = ANGLE CELL NO.

PDW = PULSE DESCRIPTOR WORD

PTDW = PULSE TRAIN DESCRIPTOR WORD

SPDW = SELECTED PULSE DESCRIPTOR WORD

RTC = REAL TIME CLOCK

LACN = LAST ANGLE CELL NO.

LTOA = LAST TIME OF ARRIVAL

AOA = ANGLE OF ARRIVAL

ATOA = ANTICIPATED TIME OF ARRIVAL

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MAAS-HARM-EO-ALE/39
ET-PE-D/C-TG-STE-MAWS
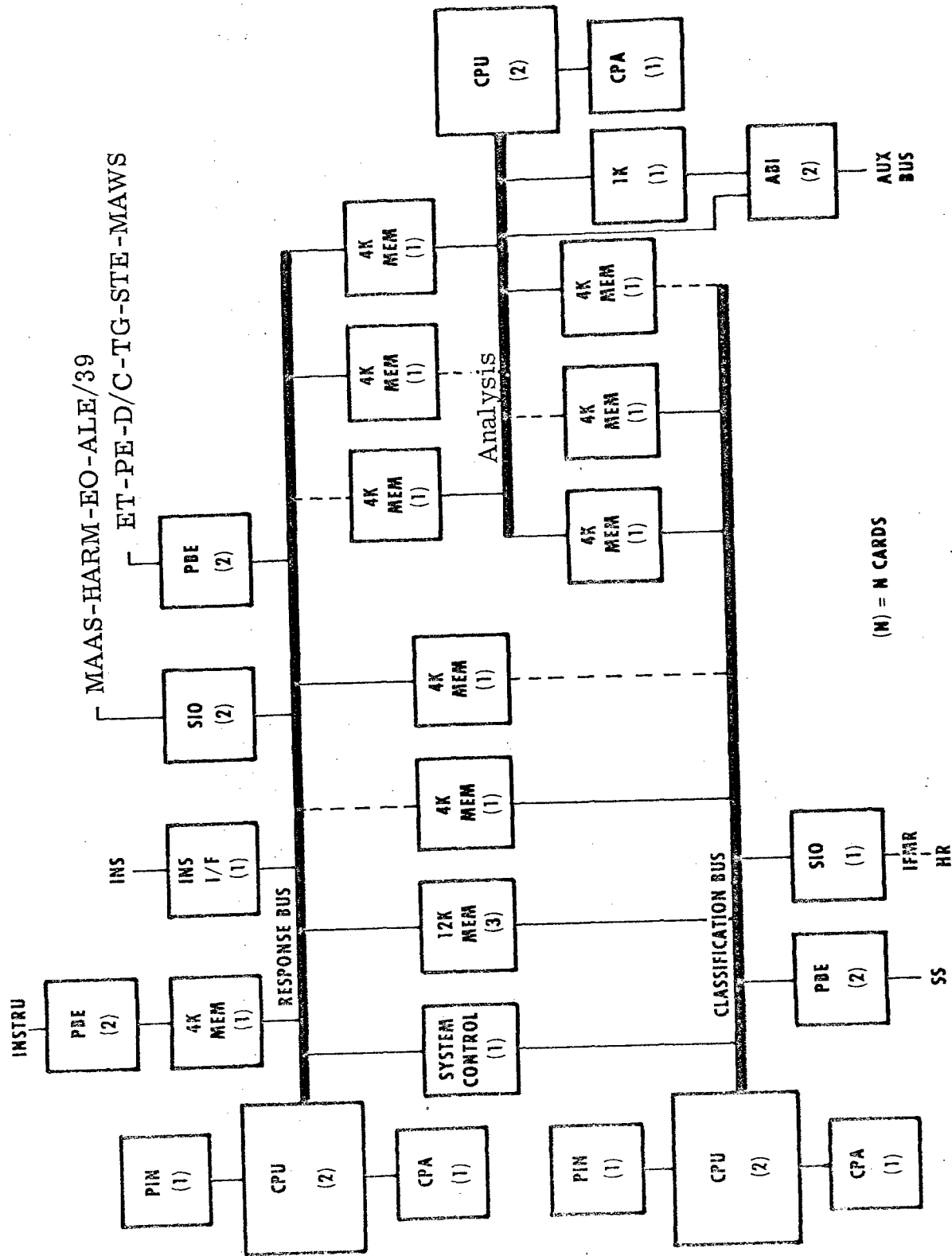
Figure 2 System Controller Architecture

(N) = N CARDS

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a) classification processor - This processor interfaces with the signal sorter supervisor and other receiver units and shall be responsible for signal acquisition and emitter classification.

b) response processor - This processor shall interface with those units normally associated with response functions. Its responsibility shall include priority assessment and resource allocation. This unit also interfaces with the operator control and display unit.

c) analysis processor - This processor interfaces with the signal sorter auxiliary output. Its responsibility shall be to process the pulse-by-pulse data made available by the signal sorter and whose results have been requested by either of the other two processors.

3.2 DETAILED PROCESSING REQUIREMENTS

This section describes the detailed functional requirements imposed upon the software which is to be implemented within the IEWS system controller. It is intended that these requirements reflect the 1980 environment however the primary objectives of this phase shall be to demonstrate overall feasibility. Consequently, software concepts and architecture shall be stressed in these requirements. Track files, emitter libraries and technique libraries shall be sized to meet ADM specifications with the intent of designing the data structures to readily expand and adapt to the EDM requirements.

3.2.1 Signal Assessment

The system controller shall maintain emitter track files on all emitters detected through the various receivers and/or sensors incorporated within the IEWS and shall assess each emitter to the degree necessary to determine the response, if any, to be generated by the IEWS.

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3.2.1.1   Signal Acquisition

The system controller shall acquire emitter signals based upon the inputs received from the following sources:

    a.   Signal Sorter

    b.   Heterodyne Receiver

    c.   AN/ALR-50

    d.   Emitter Tracker

    e.   Electro-optical sensors (growth)

    f.   MAWS (growth)

3.2.1.1.1   Signal Sorter.   The signal sorter will provide the primary inputs to the system controller for signal acquisition.   These inputs shall be:

    a.   Pulse Train Descriptor Word (PTDW)

    b.   Selected Pulse Descriptor Word (SPDW)

    c.   Unsorted Pulse Descriptor Word (UPDW)

    d.   New Emitter Pulse Descriptor Word (NPDW)

    e.   Long Pulse Parameters

    f.   AZ Read-Out Message

3.2.1.1.1.1 Pulse Train Descriptor Word.   The pulse train descriptor word (PTDW) shall comprise the most common source of emitter signals used by the system controller.   This input shall consist of the track parameters employed by the signal sorter to track individual signals in the environment and shall include:

    a.   average carrier frequency

    b.   frequency variation

    c.   average pulse repetition interval

    d.   PRI variation

    e.   average pulse width

    f.   pulse width variation

    g.   signal azimuth

    h.   peak amplitude since last update

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The system controller shall establish and maintain emitter track files based on the PTDW related messages which are sent to the system controller under the following conditions:

    a. new emitter - The signal sorter shall automatically send the first PTDW whenever a new track file has been established and shall code such inputs as a new emitter PTDW.

    b. emitter update - The signal sorter shall send updated PTDW's for each active track file at periodic intervals specified by the system controller.

    c. drop track - The signal sorter shall send a droptrack message whenever any active track file has not received an associated pulse within some interval specified by the system controller.

3.2.1.1.1.2 Selected Pulse Descriptor Word. The signal sorter shall send to the system controller, upon request by the system controller, the sequence of pulse descriptor words (PDW) associated with specified track files. Such PDW's shall be referred to as selected pulse descriptor words (SPDW).

The system controller shall use SPDW's whenever an analysis requires processing the pulse-by-pulse characteristics of a signal associated with specific track files (or emitters). The analyses required may include scan analysis, PRI analysis, frequency analysis, and correlation between and among track files.

3.2.1.1.1.3 Unsorted Pulse Descriptor Words. The signal sorter shall send to the system controller, upon request, all unsorted PDW's (UPDW's). The UPDW's may be used by the system controller as a backup for the signal sorter for emitter acquisition if:

    a. the New Emitter Start Unit (NESU) in the signal sorter has failed,

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b. the signal sorter track file is loaded, or

c. emitter deinterleaving is required.

The system controller shall accept UPDW's and process them to obtain characteristics of individual pulse trains. The ADM software shall not be required to implement a signal sorter back up function.

3.2.1.1.1.4 New Emitter Pulse Descriptor Word. In establishing a track file in the signal sorter the NESU will accumulate 10-12 PDW's as a basis for making decision to start a track file. These PDW's shall be called New Emitter Pulse Descriptor Words (NPDW's). Upon request from the system controller, the signal sorter shall send the NPDW's for a specific track file to the system controller. The system controller may process NPDW's to verify the operation of the NESU and/or to enlarge the data base for pulse-by-pulse processing as described in 3.2.1.1.1.2.

3.2.1.1.1.5 Long Pulse Parameters. The signal sorter shall send a separate message for emitters whose pulse width exceeds four microseconds. This message shall contain the track file reference and the true pulse width and pulse repetition interval of the signal associated with that track file.

3.2.1.1.1.6 AZ Read-Out Message. Whenever the AZ count threshold is exceeded in the NESU, the signal sorter shall send the AZ count and the AZ cell number to the system controller. The system controller shall interpret this message as an indication that a frequency agile emitter may be present. The system controller has the option of waiting for a normal new emitter PTDW message or may request SPDW's from the indicated azimuth cell either to provide an independent signal acquisition capability or to verify the signal sorter report.

3.2.1.1.2 Heterodyne Receiver. The heterodyne receiver (HR) in conjunction with the IFMR shall be used to acquire CW signals. The Heterodyne Receiver shall be instructed to search specified frequency band and report back to the

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system controller the presence of all CW signals which may be present in that band. The following parameters shall be reported for each such emitter:

      a. frequency

      b. azimuth

      c. amplitude

The IFMR may be used to monitor CW activity by polling the CW activity status from the IFMR. This status indicates the presence or absence of CW activity in each of the operating bands incorporated within the IFMR. Such status may be used to establish the bands to be searched using the heterodyne receiver.

The pulse measurement capability of the Heterodyne Receiver may be used by the system controller to search for low-level guidance and downlink signals associated with target track signals. The system controller shall command the Heterodyne Receiver to search the expected frequency range. The system controller shall process new emitter PTDW's for the expected frequency range and shall perform SPDW analyses, as required, to determine if an associated guidance or down link signal exists.

3.2.1.1.3   AN/ALR-50. Missile track guidance signals for the SA-2, SA-3 and SA-4 surface-to-air weapon systems shall be acquired using the AN/ALR-50 receiver. These signals shall be reported to the system controller through the signal sorter. The parameter encoder shall correlate guidance pulses with the traget track band pulses and shall append onto the PDWs that correlate a missile alert (MA) bit or a missile launch (ML) bit, or both. The signal sorter shall, as part of the track file update sequence, append onto the PTDW report, an MA alert or ML alert, or both for those track files whose PDWs exhibited the MA and/or ML bits.

The system controller may use either the signal sorter alert or process the PDW directly via the SPDW input to detect the presence of guidance

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guidance signals for the three weapon systems specified. The system controller shall identify the emitter and/or weapon system by proper association with the target track signal.

3.2.1.1.4 Emitter Tracker. The system controller shall determine the presence of interleaved pulse trains in a signal sorter track file by examining the quality (Q) factors for each new emitter. The system controller shall then assign one or more pulse train separators (PTS's) in the Emitter Tracker (ET) to the angle cell of the interleaved pulse train. The PTS's will acquire the separate pulse trains and will report the PRI of each train to the system controller. The system controller shall then establish track files, as necessary, in the signal sorter to track the pulse trains separately.

3.2.1.1.5 Electro-Optical Sensors. Data structure shall be designed to accomodate additional sensor inputs however specific implementation of an electro optic sensor interface is a growth item and will not be required as part of the ADM program.

3.2.1.1.6 Multibeam Active Warning System. Data structure shall be designed to accomodate additional sensor inputs however specific implementation of an multibeam active warning system interface is a growth item and will not be required as part of the ADM program.

3.2.1.2 Emitter Characterization

The system controller shall form an emitter descriptor word (EDW) for each of the signals active in the emitter track file. This descriptor shall include parameters necessary to accurately classify all emitters within the scope of the IEWS. Parameters may include portions of the PTDW, may be derived from the SPDWs or may be obtained as a result of correlation with other emitters in the emitter track file.

3.2.1.2.1 Emitter Types. The IEWS generally shall be required to track

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classify and respond to emitters associated with fire control systems. Such emitters will usually exhibit regular parameter characteristics of conventional pulsed radar designs. However, some variations are to be expected. Therefore, the system controller shall be required to process successfully signals corresponding to the general emitter types described in this section.

3.2.1.2.1.1 Conventional Pulse Radar. Conventional pulsed radars are characterized by constant carrier frequency, constant pulse width and constant pulse repetition intervals.

3.2.1.3.1.2 Frequency Agile Emitters. Frequency agile emitters are characterized by a variable carrier frequency which remains constant within the pulse duration but may vary either on a pulse-by-pulse basis or may change frequency from time to time over periods of many pulse periods. Three categories of frequency agility shall be defined:

    a. alternating - The carrier frequency changes on a pulse-by pulse basis on a repetitive sequence of values. The sequence length shall be limited to four values.

    b. jittered - The carrier frequency changes on a pulse-by-pulse basis on a non-repetitive basis or in a sequence which is not detectable.

    c. hopping - The carrier frequency changes occasionally to a number of values. Such signals must remain at a frequency for periods extending at least over 100 pulses. Otherwise, such signals shall be characterized as jittered.

3.2.1.2.1.3 PRI Agile Emitters. PRI agile emitters shall be characterized by variable pulse repetition interval between successive pulses. Three categories of PRI agility shall be defined:

    a. stagger - The PRI changes from pulse-to-pulse on a repetitive sequence. The sequence length shall

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be limited to sixteen values.

    b. jitter - The PRI changes from pulse-to-pulse on a non-repetitive basis or in a sequence which is non-detectable.

    c. hopping - The PRI changes occasionally to a number of values. Such signals must remain at the same PRI for periods extending at least over 100 pulses. Otherwise, such signals shall be characterized as jittered.

3.2.1.2.1.4 Correlated Emitters. Correlated emitters are two or more emitters characterized by pulses that retain a fixed position in time relative to each other. Such emitters are distinguished from a single PRI stagger emitter on the basis of having distinct, separable carrier frequencies.

3.2.1.2.1.5 CW Radar. CW radar signals shall be defined as signals which are continuous in amplitude and exhibit no discernable pulse characteristics. All such CW emitters are assumed to have relatively stable carrier frequencies. Amplitude modulation, if any, shall be of low frequency and small modulation index.

3.2.1.2.2 Scan Characteristics. The envelope of the pulse train generated by each emitter shall be used to categorize the scan mechanism of each emitter. Four scan categories shall be established as follows:

    a. steady - Corresponds to emitters which do not employ a scanning beam on transmit but maintains a high gain antenna centered on the target.

    b. conical - Corresponds to emitters which employ a conical scan or lobe switching technique on the transmit beam for tracking purposes.

    c. sector scan - Corresponds to emitter which employs a beam which sweeps a fixed angular sector on transmit. Such signals

are usually employed in track-while-scan (TWS) designs and during the acquisition phase of a conical scan or monopulse tracking radar.

    d. circular scan - Corresponds to emitter which scan a high gain antenna but at rates too low for precision tracking functions.

3.2.1.2.3   Associated Track Files. The system controller shall link track files as required to characterize emitters for classification or for response management. Specifically, the system controller shall provide file links for at least the following situations:

    a. agile emitters generating multiple files

    b. correlated multibeam emitters generating multiple files

    c. multiple files generated by a single emitter changing operating mode

3.2.1.2.3.1 Merged Files. The system controller shall be capable of determining when emitters are agile to the extent that multiple track files may have been established. If the agility is such that the files must be merged in order to obtain a continuous sequence of at least 100 PDWs, such files shall be linked with a merge code indicating that all involved files characterize a single emitter mode.

3.2.1.2.3.2 Correlated Link. The system controller shall be capable of determining multiple emitters that may be operating in synchronous operation with each other. Such emitters are individually capable of being properly characterized but exhibit the property of being correlated with one another. Pulse coincident signals shall be designated multibeam emitters, while non-pulse coincident emitters shall be referred to simply as correlated.

3.2.1.2.3.3 Mode Link - The system controller shall be capable of determining when multiple track files have been established by a single emitter which changes

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one or more parameter values from time to time. Such emitters may be identified on the basis of classification code and the fact that pulses associate with only one of the track files for periods of at least 100 pulses before switching association to one of the linked files.

3.2.1.2.4   SPDW Analaysis. The system controller may be required to process the pulse-by-pulse parameters of an emitter to derive descriptors and/or parameter measurements required for scan analysis, frequency analysis, PRI analysis, or emitter correlation. When such analysis is required, the system controller shall exploit the SPDW input available from the signal sorter.

3.2.1.3   Emitter Classification

The system controller shall uniquely classify each emitter active within the emitter track file. This operation shall consist of matching the emitter descriptor word derived for each track file against discriminant parameters included for each emitter entry in an emitter library. The system controller shall arrive either at a unique match corresponding to a single library entry resolving ambiguities where necessary or shall classify an emitter as matching none of the library entries.

3.2.1.3.1   Programmability. The emitter library shall constitute a programmable feature of the system controller. Through the library, the IEWS shall be programmed to recognize either specific emitters or generic classes of emitters and specify responses to be employed against such emitters. A library entry shall be defined to include all data inserted which corresponds to the discriminant parameters, classification code and response code for a single emitter or emitter mode. Several entries may be required to characterize all operating modes of a single emitter.

3.2.1.3.2   Emitter Library Structure. The emitter library shall include all data required to recognize an emitter of concern, specify its classiciation code and to specify the desired response code.

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3.2.1.3.2.1 Emitter Discriminants. Each library entry shall include discriminants which specify the value or range of values of the emitter descriptor word which shall be considered a potential match for that entry. These discriminants shall include at least the following parameters:

    a. frequency range (max/min)

    b. pulse repetition interval range (max/min)

    c. scan rate range (max/min)

    d. scan type (steady, conical, sector, circular)

    e. pulse width (max/min)

In addition, the following discriminants may be included:

    a. frequency type (steady, alternating, jittered, hopping)'

    b. PRI type (steady, stagger, jittered, hopping)

    c. correlation (track file/time difference)

3.2.1.3.2.2 Multiple Match Resolution. Each library entry shall also contain a numerical weighting factor to resolve ambiguities when an emitter descriptor word matches more than one emitter library entry. Weighting factors shall be specified when the emitter library is developed such that all potential ambiguities will be resolved by the operational programmer.

3.2.1.3.2.3 Classification Code. Each library entry shall contain a classification code which includes all data normally associated with a "type" designator. Data to be included as part of the classification code shall consist of at least the following items:

    a. type code (SA-2/Spin Scan, etc.)

    b. mode code (track/guidance/search)

    c. generic code (AAA/SAM/AI, etc.)

    d. platform code (land/naval/air)

3.2.1.3.2.4 Lethality Code. Each library entry shall contain a set of parameters which shall be used to calculate an emitter's lethality. Lethality shall

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be a numerical value used to rank emitters in terms of response urgency. Lethality factors shall consist of at least the following items:

     a. intrinsic value

     b. power level factor

     c. angle of arrival factor

     d. altitude factor

3.2.1.3.2.5 Response Code. Each emitter library entry shall contain a response code which shall be used to specify the response to be employed against the emitter corresponding to that library entry. The response code shall contain at least the following items:

     a. technique code

     b. external response code

The technique code shall correspond to a specific technique implemented within the IEWS technique generator.

The external response code shall be used to specify an external system response. This function shall be a growth option, however, the following systems are potential candidates:

     a. ALE-39

     b. HARM

     c. IRCM

     d. MAWS

3.2.1.4   Response Assessment

The system controller shall assess each emitter after it has been classified to determine response requirements and to implement a response if required. In general, the required response shall be coded as part of each emitter library entry, however the system controller shall be required to assess the overall situation and assign resources to perform in a dynamic environment requiring multiple responses simultaneously.

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3.2.1.4.1 <u>Priority Assignment</u>. Each emitter shall be assessed to
determine its lethality and to establish its relative priority. Lethality shall
be a numerical value calculated using a code obtained from the emitter library.
Priority shall be defined as an emitters position in a list ordered by lethality.

The lethality code obtained from the emitter library shall privide
the means of establishing a measure of hostility based upon signal identification
which is then modified by certain operational parameters. This code shall include
an intrinsic value plus function designators for power level, angle of arrival and
altitude.

The intrinsic value shall be a numeric value assigned a priori to
each library entry that is a measure of the relative lethality of that particular
emitter. This intrinsic value shall be modified by the remaining three factors
which are functions of measured emitter parameters.

The power level function(s) shall be developed to allow the emitter
to allow the emitter's peak amplitude to be used to discriminate between emitters
at relatively close range and of high priority and those emitters which may be
beyond their maximum effective weapon range.

The angle of arrival function(s) shall be developed to provide
discrimination against emitters whose lethality may vary as a function of the
attack geometry.

The altitude function(s) shall be developed to provide discrimination
against emitter whose lethality may vary with target altitude.

3.2.1.4.2 <u>Technique Selection</u>. The technique selected to be deployed against
each emitter shall be determined a priori and shall be specified using a code in
each emitter library entry. Provisions shall be included in the code structure

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to allow for both internal and external system response. Internal response shall be interpreted as referring to the IEWS technique generator. External response shall be interpreted as any other device or system which is to be activated when specific emitters are present.

3.2.1.4.3   Resource Assignment. The system controller shall assign resources as required to implement the desired response against emitters whose lethality exceeds a response threshold. If a given resource is not adequate to service all emitters, the system controller shall exercise a management function to assign that resource in an optimum allocation.

3.2.1.4.4   Rank Assignment. The system controller shall assign a rank to each emitter requiring a response which shall be used by the technique generator to resolve conflicts when conflicts exist for internal resources. This rank shall be a function of the technique assignment and the emitter priority.

3.2.1.4.5   Operator Overides. The system controller shall include provisions to recognize operator overides received via the display and control unit. Operator overrides shall include:

      a.   emitter priority

      b.   technique selection

3.2.1.4.5.1 Emitter Priority. The operator shall be allowed to designate the position of a selected emitter in list of emitters ordered by priority. This position shall be maintained by the system controller in a changing dynamic emitter.environment until changed by the operator or until the emitter is no longer active. The system controller shall allow the system to revert back to normal operation upon command by the operator.

3.2.1.4.5.2 Technique Selection. The operator shall be allowed to designate techniques to be deployed against selected emitter which override the normal automatic technique selection. Operator selected techniques shall remain in

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effect until changed by the operator or until the emitter is no longer active. The system controller shall allow the system to revert back to the normal operation upon command by the operator.

3.2.1.4.5.3 Display. The system controller shall provide special symbols or display modes (e.g. blink) for all emitters currently operating with operator override.

3.2.2   Response Programming

The system controller shall program all units required to implement the response derived during the emitter assessment program. This shall include both internal and external system response.

3.2.2.1   Internal Response

Internal response shall be defined as all response generated using the IEWS technique generator and multibeam transmitter. The requirements for such responses shall include programming and monitoring the operation of the emitter tracker, techniques generator and signal sorter. The IEWS shall be capable of generating response to twenty emitters each of which shall be assigned to a specified response channel.

3.2.2.1.1   Emitter Tracker. The system controller shall program and monitor the operations to the emitter tracker channel assigned to each emitter being jammed. These emitter trackers shall be employed primarily to perform the time division multiplexing required to interleave response against multiple emitters simultaneously.

3.2.2.1.2   Technique Generator. The system controller shall program the technique generator to implement the selected techniques against specific emitters. This shall be accomplished by furnishing a reference response channel and a techniques code. Programmable variables may also be included as required

such as maximum amplitude and scan intervals.

3.2.2.1.3 <u>Signal Sorter.</u> The system controller shall instruct the signal sorter to output certain data on the AUX BUS corresponding to the track files of the emitters being jammed. The signal sorter shall be supplied a reference response channel and a destination code for each track file corresponding to emitters actively receiving an IEWS response.

3.2.3 <u>Operator Display and Control</u>

The system controller shall provide data for the operator's display and shall respond to requests from the operators control panel. The display portion shall consist of three functional groups:

      a. polar display

      b. alpha numeric

      c. indicators

The operator control panel shall provide two functional groups for interface with the system controller:

      a. keyboard

      b. special switches

3.2.3.1 Polar Display

The system controller shall provide the operator with an angle of arrival situation display using the polar display unit. Each of sixty four angle cells shall be coded by the system controller indicating emitters activity in that cell by encoding and sending the following information:

      a. display symbol

      b. vector length

      c. special code

3.2.3.1.1 <u>Display Symbol.</u> The display symbol shall be determined for each angle cell depending on the operator designated display mode. Provisions shall

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be provided to code the following symbols:

    a. SAM 0 through SAM 9

    b. AAA

    c. AI

    d. multiple emitters

    e. unknown emitters

    f. no emitter (blank)

3.2.3.1.2   Vector Length. The system controller shall determine the vector length for a strobe which is to appear in each angle cell. The vector length shall be a function of the following parameters for the emitter of highest priority in any given angle cell.

    a. MA status (2 levels)

    b. ML status (2 levels)

    c. priority (4 levels)

3.2.3.1.3   Special Codes. The system controller shall provide additional special codes for the following conditions:

    a. blink - A blink code shall be included if any unengaged emitters or if a ML condition exists in any angle cell

    b. segment - A segment code shall be included if an uncorrelated missile guidance link is detected in any angle cell

    c. brighten - A brighten code shall be included if the symbol displayed includes or corresponds to a Naval threat.

3.2.3.1.4   Cursor. The system controller shall position an angular stabilized cursor on the polar display. This cursor shall be positioned in accordance with the operators cursor position input.

3.2.3.1.5   Display Modes. The system controller shall respond to the following operator requested polar display modes.

    a. all - Display all emitters

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b. priority - Display emitters by priority range. Selectable ranges shall be by page where each page consists of eight emitters. There shall be sixteen pages.

c. expand - All emitters in the last hooked angle cell shall be displayed with one emitter in each cell using angle cells adjacent to the correct bearing alternating left and right cells by emitter priority.

d. type - Display only those emitters corresponding to a designated type. All descriptors used in the library type code shall be available for operator selection.

e. clear - Clear the polar display unit

3.2.3.2   Alpha-Numeric Display

The system controller shall derive and format data required for the operators alpha numeric display. This display shall be used to present parameters of selected emitters and to generate tabular listings of active emitters by priority.

3.2.3.2.1   Emitter Parameter Listing. The system controller shall generate a listing of parameters for the emitter designated by the operator. These parameters shall be obtained from the emitter track file and if multiple files are involved, sequential presentations shall be displayed which are advanced by the "acquire" switch. Displayed parameters shall include:

a. type code

b. frequency

c. pulse repetition interval

d. pulse width

e. relative bearing

f. maximum signal amplitude

g. priority

h. assigned technique code.

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3.2.3.2.2　Emitter Listing.　The system controller shall maintain a prioritized list of active emitters for display upon operator request.　This list shall be divided into pages with up to eight emitters on each page.　The parameters to be included for each emitter shall include:

    a.　priority

    b.　type code

    c.　bearing

    d.　technique assignment

3.2.3.3　Indicators

The system controller shall control the illumination of the following indicators on the operator display:

a.	unengaged emitter	This indicator shall be lit whenever an unengaged emitter is present
b.	MA	This indicator shall be lit whenever any MA condition exists
c.	ML	This indicator shall be lit whenever any ML condition exists
d.	uncorrelated ML	This indicator shall be lit whenever any uncorrelated ML condition exists

3.2.3.4　Keyboard

The system controller shall respond to operator keyboard entries.　The list of available operator commands shall include:

a.	priority override	The emitter designated shall accept a priority assigned by the operator.
b.	technique override	The emitter designated shall accept a technique assigned by the operator.
c.	special	Special commands shall be implemented using a two digit code which are to be assigned during software development.

3.2.3.5   Special Switches

The system controller shall respond to a series of special functions switches located on the operators display and control unit. These switches include the following functions:

    a. alpha numeric display control(s)

    b. polar display control (s)

    c. system test

    d. emitter designate

3.2.4   System Management

The system controller shall contain provisions to perform certain functions which have been catagorized as system management. These functions include all system initialization, miscellaneous support functions required by various units within the IEWS system and responding to alert messages requiring system modification to adapt to some overflow condition.

3.2.4.1   System Initialization

The system controller shall execute a program which initializes the entire IEWS following system turn on or in response to an operator request. Initialization may consist of a full restart sequence including a program load into the system controller and the signal sorter plus initializaing all programmable options of devices connected to the system controller. Partial initialization may be requested by the operator where only data files are cleared.

3.2.4.1.1   System Controller Self Initialization. The system controller shall be capable of initializing itself as part of a power up sequence or in response to an operator request. This capability shall include provisions to load all required programs from an external storage device, such as a disc or magnetic tape cassette, using self contained logic and non volatile memory as required.

3.2.4.1.2   System Initialization. The system controller shall be required to perform any initialization required by all units connected to the system controller.

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This procedure shall generally consist of issuing a master reset following by specific instructions issued to each unit as requested. All units shall be initialized as part of the power up sequence. A partial initialization shall be executed as a result of specific operator requests.

3.2.4.1.2.1 Parameter Encoder. The parameter encoder initialization shall require, in addition to the master reset, the following initial settings:

    a. signal threshold

    b. aircraft heading

3.2.4.1.2.2 Signal Sorter. The signal sorter initialization shall require, in addition to the master reset, the following operations by the system controller:

    a. supervisor initialization

    b. program load

    c. parameter initialization

    d. instruction to start operation

The system controller shall load the signal sorter program from the external storage device after which, the signal sorter is to be placed in an operating state.

3.2.4.2   Support Functions

The system controller shall be required to perform certain supporting functions required by various devices in the IEWS which are connected to the system controller.

3.2.4.2.1   AOA to AZ Conversion Factor. The system controller shall be required to send to the parameter encoder, the aircraft heading on a periodic basis.

3.2.4.3   Alert Messages

The system controller shall be required to respond to various

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alert messages generated by various units within the IEWS which are connected to the system controller. Generally, these alert messages require some action by the system controller to alter some operating parameter to adapt to a system overload.

3.2.5 System Test

The system controller shall initiate and monitor a system test initiated by the operator. The test shall consist of instructing the technique generator to inject a simulated signal into the multibeam receiver. The emitter library shall contain an entry to recognize the signal characteristics and detection of the correct code shall constitute a successful test. A time out shall be used to determine an unsuccessful test. The results of system test shall be a Go/No Go indication to the operator.

3.2.6 Instrumentation

The system controller shall contain provisions to output certain data during normal system operations. This data shall be formatted and outputted through the instrumentation interface. Instrumentation data, in general, shall consist of processing results which are tagged with time of day. This data shall include:

    a. emitter track file changes

    b. response status changes

    c. operator overide messages

    d. overflow status

3.3   INTERFACES

The system controller shall interface with the units specified in this section. A functional description of the information to be transferred through each interface is included for each device.

3.3.1   Transfer Convention

Information transferred from an external device to the system controller shall be designated as in input transfer. Information transferred from the system controller to an external device shall be referred to as an output transfer.

3.3.2   Signal Sorter

Two interfaces shall be provided to the signal sorter. One shall consist of an interface to the signal sorter supervisor while the other shall consist of an interface to the signal sorter auxiliary (AUX) output.

3.3.2.1   Signal Sorter Supervisor

The signal sorter supervisor interface shall be used to transfer the following types of information:

    a. Sorter track file messages

    b. NESU Messages

    c. Throttle file messages

    d. Requests for data

    e. Status messages

    f. Control messages

The signal sorter supervisor messages are summarized in Table I.

3.3.2.1.1   Sorter Track File Messages. The sorter track file (STF) messages shall be as specified in Table I. STF messages shall enable the system controller to obtain data on emitters in the STF, to modify locations in the STF, to be alerted to changes in the status of the STF, and to create and delete entries in the STF.

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TABLE I

Signal Sorter Supervisor Messages

Type Message	Message Name	Input/ Output	Definition
Sorter Track File (STF)	PTDW	I	Gives average frequency, PRI, pulse width, and azimuth with quality factors. Contains peak amplitude and file maintenance parameters.
	New Emitter Alert	I	Interrupt message to system controller when new emitter is added to the STF. Contains a PTDW.
	Create STF	O	Data sent to signal sorter to establish a dummy entry in the STF.
	Confirm STF Creation	I	Verification of STF creation and gives Sorter Track File Number (SFN) assigned.
	Inactive STF Alert	I	Interrupt message to system controller when a location in the STF has not received any PDW's in a purge time interval.
	Delete STF	O	Command to signal sorter to clear a specified location in the STF.
	Long Pulse Parameters	I	Gives measured PRI and no. of PDW's received during each pulse width interval for an emitter with pulse width greater than 3.6 μsec.
	Synthetic PDW	O	Data sent to signal sorter which is processed as a normal PDW received from the PE.
	Quality Factor Mod	O	Quality factors for frequency, PRI, pulse width, and azimuth to be used by the signal sorter for a specific entry in the STF.
	ALR-50 Alert	I	Interrupt message to notify system controller that count of ML bit in update PDW's exceeded a threshold

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TABLE I (Continued)

Type Message	Message Name	Input/ Output	Definition
			value.
Sorter Track File (STF)	Purge Time Mod	O	Value of purge time to be used by the signal sorter for a specific location in the STF. Signal sorter will declare a pulse train inactive if no PDW's are received in a purge time interval.
	Frequency Mod	O	Value of track frequency to be used by the signal sorter for a specific location in the STF.
	PRI Mod	O	Value of track PRI to be used by the signal sorter for a specific location in the STF.
	Pulse Width Mod	O	Value of track pulse width to be used by the signal sorter for a specific location in the STF.
NESU	NPDW	I	PDW for those new emitters in the NESU
	AZ Read-Out	I	Gives the system controller a count of the no. of PDW's received by the NESU in a specific AZ cell during an AZ trap purge time.
	CAM File Dump	I	Contents of the CAM file in the NESU
	NESU Trk Thres	O	Number of PDW's required by NESU to declare a new emitter and establish a valid entry in the STF.
	AZ Thres Mod	O	Number of PDW's required by NESU in a single AZ cell to generate an AZ Read-Out message.
Throttle File	Throttle Alert	I	Interrupt message to notify the system controller that a new throttle file location has been assigned. Gives throttle parameters and associated SFN

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TABLE I (Continued)

Type Message	Message Name	Input/Output	Definition
Throttle	Throttle File Mod	O	Replace existing data for specified location in throttle file with that contained in message.
Data Request	CAM File Dump Req	O	Commands signal sorter to dump contents of CAM files in NESU to the system controller.
	AZ Read-Out Req	O	Commands signal sorter to dump contents of the AZ agile trap in the NESU to the system controller.
	File Dump Req	O	Commands the signal sorter to dump contents of STF to the system controller
Data Requests	PTDW Req	O	Commands signal sorter to send a PTDW for specified location in STF to the system controller.
	SPDW Req	O	Commands signal sorter to send PDW's for specified location in STF to the system controller over the Aux bus.
	SPDW Stop	O	Commands signal sorter to stop sending PDW's for specified location in STF to the system controller.
	UPDW Req	O	Commands signal sorter to send unsorted PDW's to the system controller over the Aux bus.
	UPDW Stop	O	Commands signal sorter to stop sending unsorted PDW's to the system controller.
	Transfer Table	O	Commands signal sorter to output contents of 8 memory locations in supervisor address spectrum.
	NPDW Req	O	Commands signal sorter to send the

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TABLE I (Continued)

Type Message	Message Name	Input/ Output	Definition
			PDW's from the NESU for a specified location in the STF to the system controller.
Status	Error Alert	I	Interrupt message to notify the system controller of one or more error conditions in the signal sorter.
	Input Buffer Full Alert	I	Interrupt message to notify the system controller that the input buffer in the signal sorter is full.
	Throttle File Overflow Alert	I	Interrupt message to notify the system controller that the throttle file in the signal sorter is full.
	STF Full Alert	I	Interrupt message to notify the system controller that the STF in the signal sorter is full. Contains a PTDW for a new emitter which cannot be tracked.
	Memory Dump	I	Gives the contents of 8 words of supervisor memory.
Status	Bus Hung Alert	I	Interrupt message to notify the system controller that the supervisor has addressed a non responsive device.
	Watchdog Timer Alert	I	Interrupt message to notify the system controller that the supervisor has failed to reset the watchdog timer.
	Mem Contents Changed	I	Echo check message to acknowledge the system controller modify address command.
Control	Initialize NESU	O	Commands NESU to clear files and start searching for new emitters.
	Mod Address	O	Commands signal sorter supervisor to replace contents of a specific memory

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TABLE I (Continued)

Type Message	Message Name	Input/ Output	Definition
			location with contents of message.
	Start Sorter	O	Commands signal sorter to transfer from idle mode to run mode.
	Pause Sorter	O	Commands signal sorter to enter idle loop.
	Initialize Sorter	O	Commands signal sorter to set up initial parameters and enter idle loop.
	Pause NESU	O	Commands NESU to enter idle loop.

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The signal sorter shall make a PTDW available to the system
controller for each of the active track files maintained by the signal sorter.
The PTDW shall contain track parameters including frequency, pulse repetition
frequency and pulse width plus the quality factors related to the parameter
spread of the signal being tracked in each track file. A PTDW for a specific
location in the STF shall be sent to the system controller each time that location
is updated.

The signal sorter shall alert the system controller whenever a
new emitter is detected or whenever a previously active emitter has not been
updated for a specified period of time. Updates on active emitters shall be
supplied to the system controller at periodic intervals specified by the system
controller.

The system controller shall be capable of modifying the purge time
for inactive emitters on an entry by entry basis. The system controller shall be
capable of modifying the frequency, PRI, pulse width, or quality factors for any
specific entry in the STF.

The system controller shall be capable of modifying or deleting any
active sorter track file and shall be provided with the capability of generating
new track files.

The signal sorter shall accept synthetic PDW's generated by the
system controller and shall process such PDW's as if they were generated by the
normal input from the parameter encoder.

The signal sorter shall alert the system controller whenever the
update PDW's associated with any active track file shall contain a significant
number of PDW's with the MA bit or the ML bit or both set. This alert shall be
provided at the time of track file update by the signal sorter and shall be called
the ALR-50 alert.

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3.3.2.1.2   New Emitter Start Unit (NESU).   The system controller shall have access to certain data contained within the NESU and shall be provided with the capability to modify operational parameters employed within the NESU as specified in Table I.

The signal sorter shall supply upon request the contents of the NESU azimuth agile trap.   The data contents shall include pulse count.

The system controller shall be capable of modifying both the NESU track threshold and the azimuth count threshold.

The signal sorter shall make available upon request the PDW sequence used to establish new track files.   These PDW's shall be known as new emitter pulse descriptor words (NPDW's).

The system controller shall be provided with the capability to start and halt the operation of the NESU.   This action shall not interfere or affect the tracking of signals in established active track files.

3.3.2.1.3   Throttle File.   The signal sorter shall make available to the system controller the status of the throttle unit.   It shall alert the system controller whenever a new assignment is made, a current assignment is modified or when an assignment is deleted.   The throttle factor, as well as the associated track file, shall be included in the status alert.

The system controller shall be provided with the capability to establish, modify or delete a throttle file within the signal sorter.

3.3.2.1.4   Data Requests.   The signal sorter shall process those data requests from the system controller that are specified in Table I.   The system controller shall be able to request data from the supervisor and NESU memories.   The system controller shall be able to request and to terminate requests for PTDW's, SPDW's

UPDW's, and NPDW's.

3.3.2.1.5   Signal Sorter Status. The signal sorter shall have the capability to provide the status information specified in Table I. Specifically, the signal sorter shall provide interrupts for overflow conditions in the input buffer, the throttle file, and the STF. The system controller shall be able to read memory locations in the supervisor, NESU, and track correlator memories.

3.3.2.1.6   Signal Sorter Control. The system controller shall be provided with the capability ot initialize and control the operating state of the signal sorter as specified in Table I. The system controller shall be able to initialize, start, and idle the signal sorter operation. The system controller shall be able to modify constants in the supervisor memory.

3.3.2.2   Signal Sorter Auxiliary Output
            The signal sorter auxiliary (AUX) interface shall be employed to transfer selected and unsorted pulse descriptor words (PDW) from the signal sorter to the system controller.

3.3.2.2.1   Selected Pulse Descriptor Words (SPDW). The signal sorter shall supply upon request, PDW's associated with any track file specified by the system controller. All such PDW's shall be tagged with the track file with which they were associated and shall be referred to in this state as SPDWs. Requests to transmit or stop SPDWs shall be sent through the signal sorter supervisor interface.

3.3.2.2.2   Unsorted Pulse Descriptor Words (UPDW). The signal sorter shall supply upon request all unassociated PDWs received by the signal sorter. Such PDW's shall be referred to as UPDW's. Requests to transmit or stop UPDW's shall be sent through the signal sorter supervisor interface.

3.3.3   Parameter Encoder
            An interface shall be provided between the system controller and

the parameter encoder for the purpose of transferring control commands to the parameter encoder unit.

3.3.3.1 Angle Conversion Factor

The system controller shall be capable of supplying an angle-of-arrival (AOA) to azimuth (AZ) conversion factor to the parameter encoder. This factor will be used to convert angular parameters from an aircraft coordinate system to an inertial coordinate system.

3.3.3.2 Receiver Threshold

The system controller shall be capable of supplying an amplitude threshold value to the parameter encoder. This value will be used to establish the sensitivity of the system below which no pulses will be encoded.

3.3.3.3 Long Pulse Encoding Mode

The system controller shall be capable of activating or deactivating the long pulse encoding mode employed by the parameter encoder.

3.3.4 Technique Generator

An interface shall be provided between the system controller and the technique generator for the purpose of programming the desired response to be directed against specific emitters. The program instruction shall include provisions to specify:

        a. channel assignment

        b. technique designator

        c. programmable parameters

        d. resource assignment

The system controller shall assign a specific electronic countermeasure to a dedicated tracking channel. The technique designator shall be the number of a technique including parameter setting which are independent of measured emitter parameters. For techniques dependent on emitter parameters,

the programmable parameters shall provide the technique generator with sufficient information to set-up a technique. The system controller shall assign those resources which do not have to be allocated on a real-time basis.

3.3.5 Emitter Tracker

An interface shall be provided between the system controller and the emitter tracker for the purpose of programming the generation of prediction gates to be used in time multiplexing the IEWS response. The pulse train separators (PTS's) in the emitter tracker shall also be used to deinterleave pulse trains that are being tracked as a single emitter by the signal sorter. In addition, provisions shall be included to transmit status back to the system controller.

3.3.5.1 Channel Control

The instruction sent from the system controller to the emitter tracker shall include provisions to specify on a channel-by-channel basis:

    a. desired PRI

    b. gate width

    c. polling period for drop track

3.3.5.2 Drop Track Alert

Provisions shall be provided to send a drop track alert to the system controller if any of the assigned channels do not receive an update pulse within the polling period specified by the system controller.

3.3.5.3 PRI Readout

The system controller shall be capable of reading the current value of the PRI state of any of the primary emitter tracker channels. A primary channel is one assigned to a pulse train separator.

3.3.6 Instantaneous Frequency Measurement Receiver (IFMR)

An interface shall be provided between the system controller and

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the IFMR to notify the system controller that the IFMR has detected the presence of a CW signal in the environment. The IFMR shall indicate the band in which the CW signal has been detected.

3.3.7 MAAS Receiver

An interface shall be provided between the system controller and the MAAS receiver to control the rf attenuators located in each of the beamport receivers. A single sensitivity instruction shall set all attenuators.

3.3.8 Heterodyne Receiver

An interface shall be provided between the system controller and the heterodyne receiver to provide a means to both control and to obtain descriptors of signals detected by the receiver.

3.3.8.1 Receiver Control

A control signal sent from the system controller to the heterodyne receiver shall include provisions to specify the band to be searched.

3.3.8.2 Receiver Response

The heterodyne receiver shall alert the system controller whenever a CW signal has been detected in the band specified and in addition shall alert the system controller whenever the search has been completed in the band specified.

The report for signals detected shall include the carrier frequency, azimuth and signal amplitude.

3.3.9 Display and Control

An interface shall be provided to the display and control unit for the purpose of receiving operator commands and for displaying information to the operator.

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3.3.9.1   Display Interface

The display interface shall be partioned into three categories:

a. alpha numeric display

b. vector display

c. status indicators

3.3.9.1.1   Alpha Numeric Display. The system controller shall be capable of specifying each character in a 9-row by 16-column matrix.

3.3.9.1.2   Vector Display. The system controller shall be capable of specifying independently any of 64 vector positions. Each vector position shall include provisions to specify:

a. vector length

b. display symbol

c. blink

d. naval modifier

e. uncorrelated modifier

In addition, the system controller shall be capable of positioning a cursor and a hook modifier (intensified symbol/vector) in any of the 64 vector positions.

3.3.9.2.0   Status Indicators. The system controller shall be capable of controlling the state of the following indicators;

a. unengaged emitter status (lamp)

b. ML at unknown bearing status (CRT)

c. MA at unknown bearing status (CRT)

d. MA status (Audio)

e. ML status (Audio)

3.3.9.2.1   Operator Override. Operator requests for changes in system status shall be transferred to the system controller as part of a display status

message.   These requests shall be implemented using five controls or 5
combinations of controls:

       a. program load

       b. system test

       c. priority enter (with keyboard)

       d. technique enter (with keyboard)

       e. KB command (with keyboard)

Override commands which are directed at specific emitters (c, d, and sometimes
e) shall be used in conjunction with the hook function, the acquire function and
the list pointer, whereby the hooked, acquired or pointed-to emitter is the objcect
emitter.

3.3.9.2.2   Display Requests.   Operator display mode and/or data requests
shall be transferred to the system controller as part of a display status message.
These requests shall be implemented using five controls or combinations of
controls:

       a. display mode

       b. acquire switch (with list pointer and page switch)

       c. expand switch

       d. hook switch (with cursor position)

       e. KB command (with keyboard)

3.3.10   Inertial Navigation System

An interface shall be provided between the system controller and
the inertial navigation system (INS) to provide aircraft heading and altitude data.
The system controller shall request heading and altitude data from the INS at
periodic intervals.

3.3.11   Instrumentation

An interface shall be provided between the system controller and
the instrumentation unit (IU) to allow program loading and data extraction for
instrumentation purposes.

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3.3.11.1 Program Loading

The system controller shall have the capability to control a cassette magnetic tape unit for rewinding, dumping blocks of data, and spacing the tape. The system controller shall have the capability of accepting blocks of data and transferring them to predetermined memory locations.

3.3.11.2 Data Extraction

The system controller shall specify to the instrumentation unit blocks of memory that are to be accessed to extract data for recording. The system controller shall be able to enable and disable the data extraction function of the instrumentation unit.

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4.0   QUALITY ASSURANCE

4.1   GENERAL

A quality assurance plan shall be established that assures the development of high quality software products on a timely and cost effective basis. This plan shall include provisions to:

    a. define the software development activities

    b. identify the development organization and responsibilities

    c. establish standards and conventions for both computer programs and the documentation involved to develop such programs.

    d. define the procedures for testing and integrating the computer program components.

    e. establish software development control procedures.

Quality assurance shall be implemented in accordance with Raytheon's specification 574773, Software Produce Assurance Plan except that degree to which it is implemented shall be at a level generally acceptable for an advanced development program.

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5.0   DOCUMENTATION

Software documentation shall be generated in accordance with the requirements specified in WS-8506, Requirements for Digital Computer Program Documentation. The level of documentation and publication formats shall generally be done at a level appropriate with the requirements normally associated with an advanced development program.

5.1   COMPUTER PROGRAM PERFORMANCE SPECIFICATION (CPPS)

The CPPS describes the performance requirements for the computer program portion of a given digital computer system. The CPPS contains performance criteria in terms of operational, functional, and mathematical language. The CPPS will be used by computer program design personnel and by personnel responsible for management, procurement, and maintenance of the computer program. The CPPS becomes the baseline document for configuration control of all subsequent programming efforts for the computer system.

5.2   COMPUTER PROGRAM DESIGN SPECIFICATION (CPDS)

The CPDS contains the design details for the computer program. It is prepared for the use of personnel responsible for the design, development, testing, and maintenance of the computer program and its subprograms and the personnel responsible for the procurement of the computer program. These personnel will have a general knowledge of the digital computer system architecture and programming. The CPDS is written in programming terminology and translates the functional descriptions of the Performance Specification into technical programming detail.

5.3   COMPUTER SUBPROGRAM DESIGN DOCUMENT (CSDD).

The CSDD contains the design details for each subprogram of the computer program. It is generated from the Computer Program Performance Specification and the Computer Program Design Specification, and represents the further detailing of the computer program into individual operations to be performed by the computer program. It is specifically oriented to programming

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logic and programmer's language and develops the basic subprogram logic for each subprogram section and subroutine. In effect, the CSDD presents the results of the programming efforts and provides the verification that the program fulfills the original requirements.

5.4   COMMON DATA BASE DESIGN DOCUMENT (CDBDD).

The CDBDD provides a detailed description of all data items which are required by more than on e subprogram. The CDBDD identifies all common data base items according to their type, purpose, size, range of values and structure, and provides subprogram cross referencing to aid personnel responsible for the development, testing and maintenance of the computer program.

5.5   COMPUTER PROGRAM PACKAGE (CPP)

The CPP consists of the physical computer program in the form of magnetic tape, paper tape, punched cards and program listings.

5.6   COMPUTER PROGRAM OPERATOR'S MANUAL (CPOM)

The CPOM is written for the use of the computer operator and presents the instructions and reference information required for operation of the computer system.

5.7   COMPUTER PROGRAM TEST PLAN (CPTPL)

The CPTPL defines the testing requirements for verification that the computer program fulfills the requirements of the Computer Program Performance Specification. It defines the detailed requiremens for each individual test and specifies the extent of testing and the criteria for acceptance of the program by the procuring agency.

5.8   COMPUTER PROGRAM TEST PROCEDURES (CPTPR)

The CPTPR defines the procedures for implementation of the testing requirements established in the Computer program Test Plan. Step by step information for each test regarding setup, operation, and evaluation of

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results is presented in the CPTPR.

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